



**DOWN FOR NEARLY**

**3 WEEKS**

By Ltjg. Eric Watt

**A**s with any product that has been around for decades, aircraft develop certain commonplace discrepancies. Most Orion maintenance-action forms (MAFs) tend to be discrepancies a senior maintainer probably has seen several times.

We had an airspeed problem during a training flight involving multiple touch-and-goes. During takeoff in the P-3C, power usually is set by the flight engineer after brakes are released. The copilot monitors airspeed during takeoff roll and makes three calls: “80 knots,” “refusal,” and “rotate.” The copilot calls out “80 knots” to signal the pilot to check his airspeed and verify sufficient power is set for takeoff. Rotate speeds in the P-3C vary from 115 to 130 knots, so this checkpoint provides a safe buffer to abort the takeoff.

At training weights, rotate speed is 115 knots. After our initial takeoff, the copilot—the instructor pilot in this case—said the aircraft was slow during the climb to pattern altitude. The pilot looked down at his indicator and saw 160 knots, the normal climb-out

speed to downwind. The copilot stated his airspeed indicator showed 145 knots. The maximum allowable difference between pilot and copilot airspeed indicators in the P-3 is five knots. After some discussion at pattern altitude and more cross-checks to verify the problem, the instructor pilot landed the aircraft and returned to the line.

The airspeed-indicator system uses both pitot (ram air) and static (ambient air) inputs. Initial troubleshooting focused on the dual pitot probes located below the nose radome. During climb and descent, where the airspeed discrepancy was noted, there is an angular difference in the airflow through the probes, as compared to level flight. This disrupted flow of air is negligible under normal circumstances; however, an internal problem with the probe could interfere with airspeed indications. Consequently, the pilot and copilot pitot probes were replaced, and the system operated normally.

The following flight also reported an airspeed split. Maintenance personnel determined some particulate matter could be in the system, so they purged it, using





drain ports located in the aircraft's belly. They found some bits of Teflon tape (which seals the connections) in the lines that feed ram air to the instruments. The aircraft airspeed system checked normal on deck and once again was released for flight.

ALONG WITH THE RECURRING AIRSPEED split, the next crew noted that the copilot side airspeed seemed to "ratchet" in conjunction with an altimeter split of around 150 feet, and then would eventually disappear. This gripe pointed toward the static side of the system, because the altimeter only uses a static input. After removing components connected to that system, mechs cleared the lines with pressurized air, similar to the procedure used for the pitot system. They found five different leaks in the line. The static system, however, operates on a vacuum, rather than on pressure, so the air-data test set the maintainers use for troubleshooting was unable to find all of the leaks. A special piece of equipment, used to amplify small sounds like air leaks,

was flown to the deployed location to find the last few holes. After we patched the tiny holes, the system operated normally, and the aircraft returned to fully mission-capable status.

Pilots learn early on in flight training the most challenging and unique phases of flight are takeoffs and landings. When the aircraft configuration is being changed, along with increasing or decreasing airspeed, pilots must fly close to stall speeds. P-3 rotate speeds can be as little as five percent above minimum air-control speed ( $V_{mc-air}$ ). In the above case, had there been a problem with one (or two) engines during takeoff, the aircraft would have been only 10 knots above  $V_{mc-air}$ , and the airspeed indicators would have shown a 15-knot difference.

Sometimes it's easy to overlook the effort that goes into keeping a 20-, or 30-, or even 40-year-old aircraft flying. When difficult problems such as this pitot-static discrepancy are solved, we definitely appreciate the maintainers. 🦅

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